



Group IIA containing mesoporous materials

Description of Technology: Mesoporous materials containing a Group IIA metal are prepared by a sol-gel type techniques.

Patent Listing:

1. **US Patent No. 6,562,310**, Issued on May 13, 2003, "Group IIA containing mesoporous materials"

<http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetacgi%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=6,562,310.PN.&OS=PN/6,562,310&RS=PN/6,562,310>

Market Potential: Porous materials play an important role in many chemical processes. Mg, Ba and Ca containing SiO_2 's can act as catalysts for base-catalyzed reactions. MgO/SiO_2 's are ceramic precursors to enstatite, or forsterite (Matthew B. D. Mitchell et al, Preparation and characterisation of forsterite (Mg_2SiO_4) aerogels, Journal of Non-Crystalline Solids, 255, 1998, 125-129). BaO/SiO_2 's have been reported as components in dental resins and as components for alkali resistant coatings (N. N. Ghosh et al., Synthesis of SiO_2 -BaO powder by aqueous sol-gel processing for use in dental composite resins, British Ceramic Proceedings 54, Ceramic Films and Coatings, edited by W. E. Lee). CaO/SiO_2 's have been used as media for bioactivity studies, as well as precursors for glass materials (I. Izquierdo-Barba et al., In vitro calcium phosphate layer formation on sol-gel glasses of the CaO-SiO_2 system, Departamento de Quimica Inorganica y Bioinorganica, Facultad de Farmacia, Universidad Complutense de Madrid, E-28040-Madrid, Spain, Apr. 7, 1999). Controlling the size and distribution of the pores in such materials can assist in attaining desired physical and chemical properties.

Mesoporous materials are commonly prepared using sol-gel techniques followed by freezing-drying or supercritical extraction (R. Portillo et al., Magnesia Synthesis via Sol-Gel: Structure and Reactivity, Langmuir, 12, 1996, 40-44). Both of these techniques can be energy-intensive and require specialized equipment. There is a need for techniques to produce highly mesoporous materials efficiently and at atmospheric pressures.

Benefits:

- Produce highly mesoporous materials efficiently and at atmospheric pressures

Applications:

- Mesoporous materials

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